

32/PRTS.

10/507226

DT09 Rec'd PCT/PTO 09 SEP 2004

SPRAY CAN AND PRESSURE RELEASING STRUCTURE THEREOF

FIELD OF THE INVENTION

The present invention relates to a spray can which releases compressed cosmetics, paints, propane gas or the like and a pressure releasing structure of such spray can.

BACKGROUND OF THE INVENTION

Conventionally, such fluid as cosmetics filled in a spray can has been commercially available. FIG. 36 shows an example of a spray can 101 for cosmetics. The spray can 101 comprises a sealed can body 103 for holding a compressed cosmetic fluid 102, a spout path 104 for leading the cosmetic fluid 102 to the outside, and an opening/closing means 105 for closing or opening the spout path 104. As shown in FIG. 37, the spout path 104 comprises a pipe 106 that leads to the cosmetic fluid 102 in the sealed can body 103, a spout 107 that leads to the outside, and a connecting path 108 for connecting the pipe 106 and the spout 107. The connecting path 108 is composed of a hollow part 110 of a pipe supporting member 109 for supporting the pipe 106 and a hollow part 112 of a movable member 111 that is inserted into the pipe supporting member 109. The opening/closing means 105 is composed of a packing 113 that is a blockage between the hollow parts 110 and 112 and a pushing member 114 that releases the blockage by pushing down the

movable member 111. In this spray can 101, the spout path 104 is closed by the packing 113. However, when the spray can 101 is used, the pushing member 114 is pushed down by a finger 115 and the packing 113 is deformed, so that the spout path 104 is opened and the cosmetic fluid spouts out to the outside, as shown in FIG. 38.

When such spray can 101 is disposed of, the pressure in the sealed can body has to be released and reduced substantially to the outside pressure by pushing down the pushing member 114 by a finger 115 and spouting out almost all the cosmetic fluid 102 so as to prevent an accidental explosion of gas left in the sealed can body. However, it takes long time to release pressure in this way. As an alternative method, the pressure is released from the sealed can body 103 through a hole formed in the sealed can body. However, in this case, it requires hard effort to make such hole using a tool and/or extra cost is necessary when a special equipment is used.

As the result of our researches on a pressure releasing structure of a spray can, we have eventually found the present invention. Accordingly, it is an object of the present invention is to release pressure from a spray can easily, quickly, and safely when the spray can is disposed of after use.

#### SUMMARY OF THE INVENTION

A spray can of the present invention comprises a sealed can body for holding a compressed fluid, a spout path for leading the fluid in the sealed can body to the outside, an opening/closing means for closing or opening the spout path, and a pressure releasing structure for allowing the pressure to be released from the sealed can body to the outside.

According to the spray can of the present invention, the aforementioned pressure releasing structure is an open-state maintaining means for maintaining the spout path in its open state.

According to the spray can of the present invention, the aforementioned pressure releasing structure is a breaking means for breaking the spray can.

According to the spray can of the present invention, the aforementioned breaking means is a means for breaking the spout path.

According to the spray can of the present invention, the aforementioned spout path has a pipe that leads to the fluid in the sealed can body, a spout that leads to the outside, and a connecting path for connecting the pipe and the spout, and the aforementioned breaking means is a means for separating the connecting path.

According to the spray can of the present invention, the aforementioned breaking means is a means for breaking the spout path by spring force applied to the spout path by pushing down

the pushing member and comprises a restricting means for restricting the distance that the pushing member is pushed down.

According to the spray can of the present invention, the aforementioned opening/closing means is a means for opening the spout path by pushing down the pushing member and the pushing member of the opening/closing means is the pushing member of the breaking means.

According to the spray can of the present invention, the aforementioned breaking means is a means for breaking the sealed can body.

According to the spray can of the present invention, the aforementioned pressure releasing structure is a release path forming means for releasing pressure from the sealed can body to the outside.

According to the spray can of the present invention, the aforementioned opening/closing means is a means for opening the spout path by pushing down the pushing member and is capable of forming a release path that releases the compressed fluid to the outside by pushing down the pushing member.

A pressure releasing structure of the present invention comprises a sealed can body for holding a compressed fluid, a spout path for leading the fluid in the sealed can body to the outside, and an opening/closing means for closing or opening the spout path and allows the pressure to be released from the sealed can body to the outside.

The pressure releasing structure of the present invention is an open-state maintaining means for maintaining the spout path in its open state

The pressure releasing structure of the present invention is a means for breaking the spray can.

The pressure releasing structure of the present invention is a means for breaking the spout path.

The pressure releasing structure of the present invention is a means for breaking the sealed can body.

The pressure releasing structure of the present invention is a release path forming means for releasing pressure from the sealed can body to the outside.

According to the pressure releasing structure of the present invention, the aforementioned opening/closing means has a locking means for locking the spout path so that the spout path is not opened.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIGs. 1(a) and 1(b) are a plan view and a partial front sectional view of a spray can of the present invention, respectively.

FIGs. 2(a) and 2(b) are a plan view and a partial front sectional view showing a condition where the spray can shown in FIG. 1 is in use, respectively.

FIG. 3 is a partial front sectional view showing another embodiment of the spray can of the present invention.

FIG. 4 is a partial front sectional view showing a condition where the spray can shown in FIG. 3 is in use.

FIG. 5 is a partial front sectional view showing a condition where the spray can shown in FIG. 3 is in use.

FIG. 6. is a partial front sectional view showing a condition where the spray can shown in FIG.3 is in use.

FIG. 7 is a partial front sectional view showing a condition where the spray can shown in FIG. 3 is disposed of.

FIG. 8 is a partial front sectional view showing still another embodiment of the spray can of the present invention.

FIGs. 9(a) and 9(b) are a partial front sectional view and a plan sectional view showing a further embodiment of the spray can of the present invention, respectively.

FIG. 10 is a partial front sectional view showing a still further embodiment of the spray can of the present invention.

FIG. 11 is a partial front sectional view showing a condition where the spray can shown in FIG. 10 is in use.

FIG. 12 is a right side view of a pushing means and restricting means of the spray can shown in FIG. 10.

FIG. 13 is a partial front sectional view showing a condition where the spray can shown in FIG. 10 is in use.

FIG. 14 is a partial front sectional view showing another embodiment of the spray can of the present invention.

FIG. 15 is a partial front sectional view showing a condition where the spray can shown in FIG. 14 is in use.

FIG. 16 is a partial front sectional view showing still another embodiment of the spray can of the present invention.

FIG. 17. is a partial front sectional view showing a further embodiment of the spray can of the present invention.

FIG. 18 is a partial right side sectional view showing the spray can of FIG. 17.

FIG.19 is a partial right side sectional view showing a condition where the spray can shown in FIG. 17 is in use.

FIG. 20 is a partial front sectional view showing a still further embodiment of the spray can of the present invention

FIGs. 21(a), 21(b), and 21(c) are a plan view, a partial front sectional view, and a plan view showing another embodiment of the spray can of the present invention, respectively.

FIG. 22 is a partial front sectional view showing one embodiment of a pressure releasing structure of the spray can according to the present invention.

FIG. 23 is a partial front sectional view showing another embodiment of the pressure releasing structure of the spray can according to the present invention.

FIG. 24 is a partial front sectional view showing still another embodiment of the pressure releasing structure of the spray can according to the present invention.

FIG. 25 is a partial front sectional view showing a further embodiment of the pressure releasing structure of the spray can according to the present invention.

FIGs. 26(a) and 26(b) are a partial front sectional view and a plan view showing a still further embodiment of the pressure releasing structure of the spray can according to the present invention.

FIG. 27 is a partial front sectional view showing another embodiment of the pressure releasing structure of the spray can according to the present invention.

FIG. 28 is a partial front sectional view showing still another embodiment of the pressure releasing structure of the spray can according to the present invention.

FIG. 29 is a partial front sectional view showing a further embodiment of the pressure releasing structure of the spray can according to the present invention.

FIG. 30 is a partial front sectional view showing a still further embodiment of the pressure releasing structure of the spray can according to the present invention.

FIG. 31 is a partial front sectional view showing another embodiment of the pressure releasing structure of the spray can according to the present invention.

FIG. 32 is a partial front sectional view showing still another embodiment of the pressure releasing structure of the spray can according to the present invention.



FIG. 33 is a partial front sectional view showing a further embodiment of the pressure releasing structure of the spray can according to the present invention.

FIG. 34 is a partial front sectional view showing a still further embodiment of the spray can according to the present invention.

FIGs. 35(a) and 35(b) are a partial front sectional view and a plan view showing another embodiment of the pressure releasing structure of the spray can according to the present invention, respectively.

FIG. 36 is a front sectional view of a conventional spray can.

FIG. 37 is a partial front sectional view showing a condition where the spray can showing in FIG. 36 is in use.

FIG. 38 is a partial front sectional view showing a condition where the spray can shown in FIG. 36 is in use.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Next, embodiments of the spray can and the pressure releasing structure thereof will be described with reference to the accompanying drawings.

In FIG. 1, numeral 200 indicates a spray can of the present invention. The spray can 200 comprises a sealed can body 14 for holding a compressed cosmetic fluid such as hair treatment, a spout path 16 for leading the cosmetic fluid in

the sealed can body to the outside, an opening/closing means 18 for closing or opening the spout path 16, and an open-state maintaining means 202 for maintaining the spout path 16 in its open state. The open-state maintaining means 202 functions as a pressure releasing structure of the spray can.

The spout path 16 has a pipe 22 that leads to the cosmetic fluid in the sealed can body, a spout 24 that leads to the outside, and a connecting path 26 for connecting the pipe 22 and the spout 24. The connecting path 26 is composed of a hollow part 30 of a pipe supporting member 28 for supporting the pipe 22 and a hollow part 34 of a movable member 32 that is inserted into the pipe supporting member 28. The opening/closing means 18 is composed of a packing 36 that is a blockage between the hollow parts 30 and 34 and a pushing member 38 that releases the blockage by pushing down the movable member 32.

The open-state maintaining means 202 is composed of two projections 204 provided to the pushing member 38 which is rotatable around the movable member 32 and two nails 206 provided to the sealed can body 14.

In general use of this spray can 200 for cosmetics or the like, when the pushing member 38 is pushed down, the movable member 32 is moved down, the packing 36 engaged with the movable member 32 is deformed, and therefore the hollow parts 30 and 34 are linked. When the hollow parts 30 and 34 are

linked, the cosmetic fluid spouts out from the spout 24 through the hollow parts 30 and 34 by pressure in the sealed can body 14.

Next, there will be described the case where the spray can 200 is disposed of after use. When the pushing member 38 is turned 90 degrees while the pushing member 38 is being pushed down, the movable member is moved downward and thus the projections 204 are engaged with nails 206 with the projections 204 under the nails 206, as shown in FIG. 2(a). When the projections 204 are engaged with the nails 206, the packing 36 is deformed and the hollow parts 30 and 34 are linked, as shown in FIG. 2(b). Since the condition where the hollow parts 30 and 34 are linked is maintained, even if the pushing member 38 is not pushed, the cosmetic fluid continuously spouts out from the spout 24 through the pipe 22 and the hollow parts 30 and 34 and the pressure is automatically released from the sealed can body 14.

In this way, by draining the cosmetic fluid from the sealed can body 14, the pressure in the can body 14 decreases to the atmospheric pressure. When the pressure in the sealed can body 14 becomes substantially the same as the atmospheric pressure, the spray can 200 can be disposed of.

While one embodiment of the present invention has thus been described, the spray can of the present invention can also be materialized in other embodiments.

For example, the spray can of the present invention may be a spray can 210 shown in FIG. 3. This spray can 210 comprises a sealed can body 14, a spout path 16, opening/closing means 18, and a breaking means 212 for breaking a part of the spout path 16. The breaking means 212 functions as a pressure releasing structure of the spray can. The breaking means 212 comprises a movable member 32. By deeply pushing down the movable member 32, the movable member 32 breaks and separates the pipe supporting member 28. Around the pipe supporting member 28, a notch 42 of a V-shaped cross section is provided so as to easily separate the pipe supporting member 28. Further, on the top of the sealed can body 14 is provided a ring 216 having a recessed part 214. Also, a cap 218 is provided for covering the pushing member 38. On the inner surface of the cap 218, a projection 220 that is engaged with the recessed part 214 and a projection 222 that is fit into the recessed part 214 are provided.

In general use of the spray can 210, when the pushing member 38 is pushed down by a finger 48, the movable member 32 is moved down, the packing 36 engaged with the movable member 32 is deformed, and therefore the hollow parts 30 and 34 are linked, as shown in FIG. 4. When the hollow parts 30 and 34 are linked, the cosmetic fluid spouts out from the spout 24 through the hollow parts 30 and 34 by pressure in the sealed can body.

Next, there will be described the case where the spray can 210 is disposed of after use. When the cap 218 is pushed down hard by a finger, the projection 222 is fitted into the recessed part 214, as shown in FIG. 5. Then, the cap 218 is pulled up by fingers, the pushing member 38 and the ring 216 are pulled out upwards, as shown in FIG. 6. Next, the spray can 210 is turned upside down, and then the movable 32 is hit on the hard ground or the like. By doing this, the movable member 32 is pushed into the sealed can body more deeply than when it is generally used and hits against the inner surface of the pipe supporting member 28, and the pipe supporting member 28 is broken and separated at the notch 42. As shown in FIG. 7, the separated part is fallen down in the sealed can body 14. When the pipe supporting member 28 is broken, the cosmetic fluid flows into the hollow part 30 by pressure in the sealed can body and spouts out to the outside. Since the cosmetic fluid spouts out not through the pipe 22, the cosmetic fluid spouts out more quickly without decrease in speed due to fluid friction in the pipe 22. When the pipe supporting member 28 is broken, the movable member 32 may be fallen into the sealed can body 14. This enables the cosmetic fluid to spout out much more quickly. Furthermore, the pipe supporting member 28 may be broken by putting one's weight on the spray can 210 while the movable member 32 of the spray can 210 is turned upside down and pressed against the hard ground or the like.

Further, the pipe supporting member 28 may be broken by hitting the pushing member 38 itself on the hard ground or the like or by putting one's weight thereon. In this case, it is preferable that the movable member 32 is longer in length.

Further, in the spray can 210, the ring 216 may be made of fragile material like wax so as to remove the ring 216 after it is broken and to deeply press the movable member 32.

Furthermore, the ring 216 may be pulled upwards.

Alternatively, the spray can of the present invention may be a spray can 230 shown in FIG. 8. In this spray can 230, a lower part of the hollow part 30 is tapered. When the ring 216 is removed and the movable member 32 is pushed down, the movable member 32 is forcibly inserted into the hollow part 30 and fixed so that the pressure can be released. In this case, the lower part of the hollow part 30 which is tapered functions as an open-state maintaining means (pressure releasing structure).

Alternatively, the spray can of the present invention may be a spray can 240 shown in FIG. 9. This spray can 240 comprises a groove pattern 242 on the bottom of the sealed can body 14. The groove pattern 242 is composed of a small circle groove 244, a big circle groove 246, and radial grooves 248. Such groove pattern 242 makes it possible to easily break the bottom of the sealed can body 14 by hand or a tool so as to release the pressure when the spray can 240 is disposed of.

FIG. 9 shows as an example that the groove pattern 242 is formed on the inner surface of the bottom of the sealed can body 14, however, the groove pattern 242 may be formed on the outer surface of the bottom of the sealed can body 14.

Further, FIG. 9 shows as an example that the groove pattern 242 is like a chrysanthemum pattern or a sectional pattern of an orange, however, it may be like a honeycomb pattern or a scale pattern.

Alternatively, the spray can of the present invention may be a spray can 10 shown in FIG. 10. The spray can 10 comprises a sealed can body 14 for holding a compressed cosmetic fluid such as hair treatment, a spout path 16 for leading the cosmetic fluid in the sealed can body 14 to the outside, an opening/closing means 18 for closing or opening the spout path 16, and a breaking means 20 for breaking a part of the spout path 16. The breaking means 20 is composed of a movable member 32 and a spring 40. When the movable member 32 is pushed down more deeply, the pipe supporting member 28 is separated and broken by the spring force of the spring 40. Around the pipe supporting member 28, there is provided a notch 42 of a V-shaped cross section so as to easily separate the pipe supporting member 28. In order to prevent the pipe supporting member 28 from being broken except when the spray can 10 is disposed of, a resin stopper 44 (restricting means) for restricting the distance that the pushing member 38 is

pushed down is separably fixed on the bottom of the pushing member 38.

In general use of the spray can 10, when the pushing member 38 is pushed down by a finger 48, the movable member 32 is moved down, the packing 36 engaged with the movable member 32 is deformed, and therefore the hollow parts 30 and 34 are linked, as shown in FIG. 11. When the hollow parts 30 and 34 are linked, the cosmetic fluid spouts out from the spout 24 through the pipe 22 and the hollow parts 30 and 34 by pressure in the sealed can body 14.

Next, there will be described the case where the spray can 10 is disposed of after use. First, the stopper 44 is cut off along a cutoff line 46 shown in FIG. 12. Then, the pushing member 38 is pushed down by a finger 48 to such a degree that it comes into contact with the sealed can body 14. The movable member 32 is moved more downward than when it is generally used as described above, and the spring force of the spring 40 becomes stronger than when it is generally used as described above. By increased spring force, the pipe supporting member 28 is broken and separated at the notch 42, as shown in FIG. 13. When the pipe supporting member 28 is broken, the cosmetic fluid flows into the hollow part 30 by pressure in the sealed can body 14 and spouts out to the outside. Since the cosmetic fluid spouts out not through the



pipe 22, the cosmetic fluid spouts out more quickly without decrease in speed due to fluid friction in the pipe 22.

Alternatively, the spray can of the present invention may be a spray can 50 shown in FIG. 14. In this spray can 50, a movable member 52 is longer than the movable member 32 of the spray can 10 shown in FIG. 10. Therefore, when the stopper 44 is cut off and the pushing member 38 is pushed down more deeply so as to dispose of the spray can 50, the movable member 52 is directly hit against the pipe supporting means 28, and the pipe supporting member 28 is separated, as shown in FIG. 15.

Alternatively, the spray can of the present invention may be a spray can 56 shown in FIG. 16. This spray can 56 comprises a spout path 16 having a packing 58. When the stopper 44 is cut off and the pushing member 38 is pushed down so as to dispose of the spray can 56, the packing 58 that is engaged with the movable member 32 is stretched and broken.

Alternatively, the spray can of the present invention may be a spray can 60 shown in FIG. 17. This spray can 60 comprises a sealed can body 14, a spout path 16, an opening/closing means 18, and a release path forming means 62 for forming a release path that releases the cosmetic fluid to the outside. The release path forming means 62 functions as a pressure releasing structure of the spray can. As shown in FIG. 18, the release path forming means 62 is composed of a recessed part 66 provided on a part of the side wall of the

movable member 64 and a packing 36. The pushing member 38 has a hole 68 for releasing cosmetic fluid. When the stopper 44 is cut off and the pushing member 38 is pushed down so as to dispose of the spray can 60, the release path 70 is formed between the packing 36 and the recessed part 66, so that the cosmetic fluid is released from the hole 68 through the release path 70.

Alternatively, the spray can of the present invention may be a spray can 72 shown in FIG. 20. This spray can 72 has a hole 74 in the sealed can body 14, and the hole 74 is closed by a closing member 76. A beveled surface of the hole 74 and a beveled surface of the closing member 76 are in contact with each other. The closing member 76 is pressed by the inner pressure of the sealed can body 14 and is brought in tight contact with the hole 74. When the spray can 72 is disposed of, the pushing member 38 is removed and broken, and the closing member 76 is pressed into the sealed can body 14 so that the closing member 76 falls into the sealed can body 14. Thus, by opening the hole 74, the release path for releasing the pressure is formed.

Alternatively, the spray can of the present invention may be a spray can 300 shown in FIG. 21. In this spray can 300, the pushing member 38 is rotatable to the sealed can body 14 and comprises a projection 302, and the sealed can body 14 comprises a nail 304. When this spray can 300 is placed on

the market, the projection 302 is engaged with the nail 304 with the projection 302 on the nail 304, as shown in FIGs. 21(a) and 21(b), and therefore the pushing member 38 cannot be pushed down and the cosmetic fluid cannot be released. In other words, the projection 302 and the nail 304 function as a locking means for locking the spout path 16 so that the spout path 16 cannot be opened. Unless the pushing member 38 is rotated to release the locking means, the cosmetic fluid cannot be released. Therefore, there is no need to provide a cap to the spray can.

The cosmetic fluid can be released by turning the pushing member 38 about 90 degrees so as not to engage the nail 302 with the projection 302, as shown in FIG. 21(c), and then moving the pushing member 38 downward. When the spray can 300 is disposed of, the pushing member 38 is pushed downward, and then rotated about 90 degrees so that the projection 302 can be engaged with the nail 304 with the projection 302 under the nail 304. In this way, the spout path 16 can be maintained in its open state and the cosmetic fluid can be released.

Alternatively, another projection which can be cut out may be provided above the projection 302. In this case, when the pushing member 38 is pushed downward and rotated for disposal of the spray can, this another projection may be cut out so as to engage the projection 302 with the nail 304 with the projection 302 under the nail 304. This can prevent the

pushing member 38 from being pushed downward and rotated so as to engage the projection 302 with the nail 304 and thus prevent the possibility that the pushing member 38 cannot be put back to the upper position when the spray can is not disposed of. Alternatively, a coin groove for rotating the pushing member 38 by coin may be provided on the top surface of the pushing member 38. In FIG. 21, the nail 304 is integrally formed with the sealed can body 14, however, the nail 304 which is formed separately from the sealed can body 14 may be forcibly inserted into the top of the sealed can body 14.

Alternatively, as shown in FIG. 22, in a pressure releasing structure 310, a protrusion 318 may be provided to the spout 24 of the pushing member 38 that is rotatable to the sealed can body 14, and a guard 312 having a projection 314 as a locking means and a window 316 as an open-state maintaining means may be provided to a caulked projection 15 of the sealed can body 14 in such a manner that the guard 312 surrounds the pushing member 38. As the caulked projection 15, a conventional caulked projection of a sealed can body can be used, and the guard 312 is detachably/attachably provided to the caulked projection 15. Further, the window 316 is connected to the outside of the guard 312.

When the pressure releasing structure 310 of this spray can is placed on the market, the protrusion 318 is engaged with the projection 314 with the protrusion 318 on the projection

314, as shown in FIG. 22, and therefore the pushing member 38 cannot be pushed down and the cosmetic fluid cannot be released. When the cosmetic fluid is released, the pushing member 38 is rotated so as to disengage the protrusion 318 from the projection 314 and then pushed downward. When the spray can is disposed of, the pushing member 38 is pushed downward and rotated so as to engage protrusion 318 in the window 316. Thus, the spout path 16 can be maintained in its open state and the cosmetic fluid can be released. Preferably, a coin groove is provided on the top surface of the pushing member 38 so that the pushing member 38 can be rotated only by a coin. This is preferable for safety reasons because children cannot easily rotate the pushing member 38.

The pressure releasing structure 310 of this spray can can be applied to a conventional sealed can body having a caulked projection. Therefore, the pressure can be released from a conventional sealed can body using this pressure releasing structure 310, if the pushing member 38 and the guard 312 are provided thereto. It is also possible that a sealed can body with cosmetics, paints, propane gas, or the like filled therein are placed on the market without attaching the pushing member 38 and so on. In this case, a user can release the pressure from the sealed can body by attaching the pushing member 38 and guard 312 on hand thereto. If the sealed can body is placed alone on the market, it is preferable to provide an elastic

tube, cap, or the like to the movable member 32 of the sealed can body 14 in advance so as to prevent accidental pushing of the pushing member 38.

Alternatively, the spray can of the present invention may be a spray can 320 shown in FIG. 23. In this spray can 320, the pushing member 38 comprises a stopper 322 which can be cut out and which functions as a restricting means and a projected part 326 which can be engaged in the recessed part 324 of the sealed can body 14 and which functions as an open-state maintaining means. When this spray can 320 is disposed of, the pushing member 38 is pushed into the sealed can body 14 by hitting it or so to such a degree that the stopper 322 is cut out, as shown in FIG. 23 by chained lines, and thus the projected part 326 is engaged in the recessed part 324. In this way, the pushing member 38 is maintained in its pushed state and the spout path 16 is maintained in its open state, so that the cosmetic fluid can be released. When the stopper 322 is cut out by pushing the pushing member 38 into the sealed can body 14, it is preferable that the lower part of the pushing member 38 is resiliently spread to engage the projected part 326 in the recessed part 324. Since the stopper 322 restricts the pushing distance of the pushing member 38, the projected part 326 is not engaged in the recessed part 324 except when the spray can is disposed of.

Alternatively, in a pressure releasing structure 330 of the spray can, the pushing member 38 may comprise a stopper 44 which can be cut out and which functions as a restricting means and a projected part 332 which can be engaged with the lower part of the caulked projection 15 of the sealed can body 14 and which functions as an open-state maintaining means. When the spray can is disposed of, the stopper 44 which is provided on the lower part of the pushing stopper 38 is cut out and the pushing means 38 is pushed down, so that the projected part 332 is engaged with the lower part of the caulked projection 15, as shown in FIG. 24 by chained lines. In this way, the pushing member 38 is maintained in its pushed state and the spout path 16 is maintained in its open state, so that the cosmetic fluid can be released. Since the stopper 44 restricts the pushing distance of the pushing member 38, the projected part 332 is not engaged in the caulked projection 15 except when the spray can is disposed of. The pressure releasing structure 330 of this spray can can be applied to a conventional sealed can body having a caulked projection. Therefore, the pressure can be released from a conventional sealed can body using this pressure releasing structure 330, if the pushing member 38 is provided thereto.

Alternatively, as shown in FIG. 25, in the pressure releasing structure 340 of the spray can, the guard 324 may be provided on the caulked projection 15 of the sealed can body 14

in such a manner that the pushing member 38 is sandwiched in the guard 324, a pair of upper grooves 344 and a pair of lower grooves 346 (open-state maintaining means) may be provided in the inner surface of the guard 342 which is opposed to the pushing member 38, and a plate 348 may be attachably/detachably inserted between the upper grooves 344 or between the lower grooves 346. When this pressure releasing structure 340 of the spray can is placed on the market, the plate 348 is put in the upper grooves 344 to cover the pushing member 38, as shown in FIG. 25, so that the pushing member 38 cannot be pushed down and the cosmetic fluid cannot be released.

When the cosmetic fluid is released, the plate 348 is pulling out from the upper grooves 344 to the rear and then the pushing member 38 is pushed down. When the spray can is disposed of, the pushing member 38 is pushed downward, and then the plate 348 is put in between the lower grooves 346 to fix the pushing member 38 under the plate 348. In this way, the spout path 16 can be maintained in its open state so that the cosmetic fluid can be released. The pressure releasing structure 340 of this spray can can be applied to a conventional sealed can body having a caulked projection. Therefore, the pressure can be released from a conventional sealed can body using this pressure releasing structure 340, if the guard 342 and the plate 348 are provided thereto.



The direction the upper grooves 344 and the lower grooves 346 are formed and the direction the plate 348 is put in are not limited to the direction perpendicular to the moving direction of the pushing member 38. As far as the pushing member can be maintained in its pushed state, such directions may be the direction parallel to the moving direction of the pushing member 38 or the direction oblique thereto.

Alternatively, instead of removably inserting the plate 348 into a pair of upper grooves 344 or a pair of lower grooves 346, a pair of upper holes and a pair of lower holes (open-state maintaining means) may be formed in the inner surface of the guard 342 which is opposed to the pushing member 38, and a pin material may be removably inserted into the upper holes or lower holes. FIG. 25 shows as an example that the guard 342 is fit over the caulked projection 15 from above the sealed can body 14. However, the guard 342 may be fit inside the caulked projection 15 of the sealed can body 14 or fit outside the caulked projection 15 from the side of the sealed can body 14. Also, a nail directed towards the outside may be provided at the top of the sealed can body 14 to removably engage the guard 342 with the nail or the guard 342 may be screwed into the top of the sealed can body 14.

Alternatively, as shown in FIG. 26, in the pressure releasing structure 350 of the spray can, the guard 352 may be provided to the caulked projection 15 of the sealed can body 14

in such a manner that the pushing member 38 is enclosed by the guard 352. In this case, the pushing member 38 may be moved up and down by engaging a shaft 356 provided to the one end of the pushing member 38 with a bearing 354 provided to the guard 352 and operating a lever 357 provided to the other end of the pushing member 38. As an open-state maintaining means, a pair of bendable plates 358 is provided to the upper part of the guard 352. When the spray can is disposed of, the pushing member 38 of this pressure releasing structure 350 is pushed downward, and then the bendable plates 358 are bent towards the pushing member 38's side, as shown in FIG. 26(b) by chained lines, so as to engage the pushing member 38 with the lower part of the bendable plates 358. By doing this, the pushing member 38 is maintained in its pushed state and the spout path 16 is opened so that the cosmetic fluid can be released.

Alternatively, as shown in FIG. 27, in the pressure releasing structure 360 of the spray can, the guard 362 may be provided to the caulked projection 15 of the sealed can body 14 in such a manner that the pushing member 38 is enclosed by the guard 362. In this case, the pushing member 38 may be moved up and down by connecting the one end of the pushing member 38 to the guard 362 through a flexible joint 364 and operating a lever 366 provided to the other end of the pushing member 38. On the lower part of the lever 366, a projection 368 is provided. A protruding block 370 for preventing the

projection 368 from moving down is provided to the guard 362. Such projection 368 and the protruding block 370 function as a restricting means as well as an open-state maintaining means. In this pressure releasing structure 360, when the spray can is disposed of, by pressing the lever 366, the projection 368 is pushed down under the protruding block 370 and thus engaged with the protruding block 370. In this way, the pushing member 38 is maintained in its pushed state and the spout path 16 is opened so that the cosmetic fluid can be released. Except when the spray can is disposed of, the protruding block 370 prevents the projection 368 from moving down, and thus the pushing distance of the pushing member 38 is restricted by the protruding block 370.

The pressure releasing structure of the spray can according to the present invention may be a pressure releasing structure 400 shown in FIG. 28. This pressure releasing structure 400 is composed of a cap 402 which is attachably/detachably attached to the inside of the caulked projection 15 of the sealed can body 14. On the outer surface of the cap 402 is provided an upper projection 404 which can be engaged with the caulked projection 15 as an open-state maintaining means, and on the lower part of the cap 402 is provided a stopper 44 which can be cut out along a cutoff line 46. Further, on the outer surface of the stopper 44 is provided a lower projection 406 which can be engaged with the

caulked projection 15 with the lower projection 406 under the caulked projection 15. Furthermore, on the inner side of the top of the cap 402 is provided a push projection 408 with a V-shaped groove in its end, and on the side of the cap 402 is provided an opening 410.

When this pressure releasing structure 400 is placed on the market, the lower projection 406 of the stopper 44 is engaged with the caulked projection 15 with the lower projection 406 under the caulked projection 15, as shown in FIG. 28, and the cap 402 is attached to the sealed can body 14. When the spray can is disposed of, the stopper 44 provided on the lower part of the cap 402 is cut out, the movable member 32 is pushed down using the push projection 408, and thus the cap 402 is pushed down under the caulked projection 15 so that the upper projection 404 is engaged with the caulked projection 15. In this way, the movable member 32 is maintained in its pushed state, and the spout path 16 is opened so that the cosmetic fluid can spout out. FIG. 28 shows as an example that the sealed can body 14 is a gas cylinder for a portable gas burner, however, the pressure releasing structure 400 can be applied to the spray can having a pushing member attached to the upper part of the movable member. Further, the push projection 408 on the inner surface of the top of the cap 402 is not always needed, but the movable member 32 may be directly pushed down by the top of the cap 402. Furthermore, the upper projection

and the lower projection may be provided on the inner surface of the cap 402 and the cap 402 may be attachably/detachably attached to the outside of the caulked projection 15.

The pressure releasing structure 400 of this spray can can be applied to a conventional sealed can body having a caulked projection. Therefore, the pressure can be released from a conventional sealed can body using this pressure releasing structure 400, if the cap 402 is provided thereto. It is also possible that a sealed can body 14 with cosmetics, paints, propane gas, or the like filled therein is placed on the market without attaching the pushing member and so on. In this case, a user can release the pressure from the sealed can body by attaching the cap 402 on hand thereto. If the sealed can body is placed alone on the market, it is preferable to provide an elastic tube, cap, or the like to the movable member 32 of the sealed can body 14 in advance so as to prevent accidental pushing of the movable member 32.

Alternatively, as shown in FIG. 29, in the pressure releasing structure 420 of the spray can, a screw member 424 may be screwed into the top of the cap 422 as an open-state maintaining means in such a manner that the screw member 424 can be screwed up and down. The screw member 424 is screwed up and down in the cap 422 by inserting a coin or the like into a groove 426 formed in the top surface of the screw member 424 and rotating the screw member 424 using the coin or the like.

On the lower part of the cap 422 is provided a protrusion 428 which can be engaged with the caulked projection 15, and on the side of the cap 422 is provided an opening 430.

When this pressure releasing structure 420 is placed on the market, the protrusion 428 is engaged with the caulked projection 15 with the protrusion 428 under the caulked projection 15, as shown in FIG. 29, and the cap 422 is attached to the sealed can body 14. When the spray can is disposed of, the screw member 424 is screwed down so as to push down the movable member 32 with the cap 422 attached to the sealed can body 14. In this way, the movable member 32 is maintained in its pushed state, and the spout path 16 is opened so that the cosmetic fluid can spout out. The pressure releasing structure 420 of this spray can can be applied to a conventional sealed can body having a caulked projection. Therefore, the pressure can be released from a conventional sealed can body using this pressure releasing structure 420, if the cap 422 is provided thereto. Since the screw member 424 can be screwed down to an arbitrary position, the pressure releasing structure 420 can be widely applied to various sealed can body having a movable member of different length. It is preferable for safety reasons that the screw member 424 is rotated only by a coin so that children cannot easily rotate the screw member 424. FIG. 29 also shows as an example that the sealed can body 14 is a gas cylinder for a portable gas

burner, however, the pressure releasing structure 420 can be applied to the spray can having a pushing member attached to the upper part of the movable member 32. When the pressure releasing structure 420 is applied to the spray can with a pushing member attached thereto, a cut may be formed in the lower part of the cap 422 and the movable member 32 may be inserted into the cut, so that the pushing member is pulled out by using the cap 422 as leverage.

Alternatively, as shown in FIG. 30, in the pressure releasing structure 440 of the spray can, a push member 444 may be fit into the top of the cap 442 as an open-state maintaining means in such a manner that the push member 444 can be moved up and down. In this case, in the top of the cap 442 are provided an upper groove 446 and a lower groove 448, and on the side of the push member 444 is provided a projection 450 which can be engaged in the upper groove 446 or the lower groove 448. Further, on the lower part of the cap 442 is provided a protrusion 452 which can be engaged with the caulked projection 15, and on the side of the cap 442 is provided an opening 454.

When this pressure releasing structure 440 is placed on the market, the projection 450 of the push member 444 is engaged in the upper groove 446 and the protrusion 452 is engaged with the caulked projection 15 with the protrusion 452 under the caulked projection 15, as shown in FIG. 30, and thus the cap 442 is attached to the sealed can body 14. When the

spray can is disposed of, the push member 444 is forcibly pressed downward with the cap 442 attached to the sealed can body 14, the movable member 32 is pushed down, and thus the projection 450 is engaged in the lower groove 448. In this way, the movable member 32 is maintained in its pushed state, and the spout path 16 is opened so that the cosmetic fluid can spout out. The pressure releasing structure 440 of this spray can can also be applied to a conventional sealed can body having a caulked projection. Therefore, the pressure can be released from a conventional sealed can body using this pressure releasing structure 440, if the cap 442 is provided thereto. FIG. 30 shows as an example that the cap 442 is fit inside the caulked projection 15 from above the sealed can body 14. However, the cap 442 may be fit outside the caulked projection 15 of the sealed can body 14 or fit outside the caulked projection 15 from the side of the sealed can body 14.

Alternatively, as shown in FIG. 31, in the pressure releasing structure 460 of the spray can, a bendable plate 464 may be provided to the top of the cap 462 as an open-state maintaining means. Both sides of the bendable plate 464 is separated from the top of the cap 462, a front edge of the bendable plate 464 is connected to the top of the cap 462 through a break part 466, and a rear edge of the bendable plate 464 is bendably connected to the top of the cap 462. Further, on the lower part of the cap 462 is provided a protrusion 468



which can be engaged with the caulked projection 15, and on the side of the cap 442 is provided an opening 469.

When this pressure releasing structure 460 is placed on the market, the protrusion 468 is engaged with the caulked projection 15 with the protrusion 468 under the caulked projection 15, as shown in FIG. 31, and the cap 462 is attached to the sealed can body 14. When the spray can is disposed of, the cap 462 is removed and the front edge of the bendable plate 464 is forcibly pressed to break the break part 464, and then the bendable plate 464 is bent inside the cap 462 as shown by chained lines. Then, while the movable member 32 is being pushed downward by using the bendable plate 464, the cap 462 is pressed inside the caulked projection 15 so as to engage the protrusion 468 with the caulked projection 15 with the protrusion 468 under the caulked projection 15. In this way, the movable member 32 is maintained in its pushed state, and the spout path 16 is opened so that the cosmetic fluid can spout out.

Alternatively, as shown in FIG. 32, in the pressure releasing structure 470 of the spray can, a push member 476 having a inclined surface 474 may be provided to the top of the cap 472 as an open-state maintaining means. Further, on the lower part of the cap 472 is provided a protrusion 478 which can be fit to the caulked projection 15 with the protrusion 478 under the caulked projection 15. One end of the cap 472 is

notched. While the protrusion 478 is being fit to the caulked projection 15, the cap 472 can be engaged with the caulked projection 15 by sliding it from the side of the sealed can body 14. When this pressure releasing structure 470 is disposed of, the cap 472 is engaged with the caulked projection 15 by sliding it from the side of the sealed can body 14, and then the movable member 32 is pushed downward by using the inclined surface 474 of the push member 476. In this way, the movable member 32 is maintained in its pushed state, and the spout path 16 is opened so that the cosmetic fluid can spout out.

Alternatively, as shown in FIG. 33, in the pressure releasing structure 480 of the spray can, a bendable plate 484 may be provided on a part of the side wall of the cap 482 as an open-state maintaining means. Both sides of this bendable plate 484 are separated from the side wall of the cap 482, and the top part of the bendable plate 484 is bendably connected to the side wall of the cap 482. Further, on the lower part of the cap 482 is provided a protrusion 486 which can be engaged with the caulked projection 15 with the protrusion 486 under the caulked projection 15.

When this pressure releasing structure 480 is placed on the market, the protrusion 486 is engaged with the caulked projection 15 with the protrusion 486 under the caulked projection 15, as shown in FIG. 33, and thus the cap 482 is

attached to the sealed can body 14. When the spray can is disposed of, the cap 482 is removed, the lower part of the bendable plate 484 is pressed so as to bend it inside the cap 482 as shown by chained lines, and then the lower part of the bendable plate 484 is abutted against the inner surface of the opposite side wall of the cap 482. Then, while the movable member 32 is being pushed downward by using the bendable plate 484, the cap 482 is pressed inside the caulked projection 15 so as to engage the protrusion 468 with the caulked projection 15 with the protrusion 468 under the caulked projection 15. In this way, the movable member 32 is maintained in its pushed state, and the spout path 16 is opened so that the cosmetic fluid can spout out. When the bendable plate 484 is bent inside the cap 482, an opening is formed in a part of the side wall of the cap 482. Through this opening, the cosmetic fluid or the like can be released to the outside. In some cases, a protrusion may be provided on the opposite inner side surface of the cap 482 so as to support the lower end of the bent bendable plate 484.

Alternatively, the spray can of the present invention may be a spray can 500 shown in FIG. 34. This spray can comprises a sealed can body 14, a spout path 16, an opening/closing means 18, and a breaking means 502 for breaking a part of the spout path 16. This breaking means 502 functions as a pressure releasing structure of the spray can. The breaking means 502

comprises a movable member 32. By deeply pushing down the movable member 32, the movable member 32 breaks and separates the pipe supporting member 28. Around the pipe supporting member 28, a notch 42 of a V-shaped cross section is provided so as to easily separate the pipe supporting member 28. Further, on the top of the movable member 32, a pushing member 504 is attachably/detachably attached. Around the pushing member 504, a projection 506 is provided as a restricting means.

In general use of this spray can 500, when the pushing member 504 is pushed down, the movable member 32 is moved down, so that the cosmetic fluid can be released. When the pushing member 504 is pushed downward, the projection 506 is struck by the caulked projection 15, so that the distance that the movable member 32 is pushed down can be restricted to a predetermined distance. When the spray can is disposed of, the pushing member 504 is removed from the movable member 32. Then, the sealed can body 14 is turned upside down, and then the movable member 32 is hit on the hard ground or the like. The movable member 32 is hit against the inner surface of the pipe supporting member 28 and the pipe supporting member 28 is broken at the notch 42. Thus, the cosmetic fluid is released through the broken part and a hollow part 30 to the outside by the pressure in the sealed can body 14.

In order to easily remove the pushing member 504 from the movable member 32, it is preferable that a lever piece for

prying the pushing member 504 away from the sealed can body 14 is inserted between the pushing member 504 and the sealed can body 14. This lever piece may be attachably/detachably attached to the pushing member 504. It is also possible that a sealed can body 14 with cosmetics, paints, propane gas, or the like filled therein is placed on the market without attaching the pushing member 504. In this case, a user can release the pressure from the sealed can body by attaching the pushing member 504 on hand thereto. If the sealed can body is placed alone on the market, it is preferable to provide an elastic tube, cap, or the like to the movable member 32 of the sealed can body 14 in advance so as to prevent accidental breaking of the pipe supporting member 28.

Alternatively, the spray can of the present invention may be a spray can 600 shown in FIGs. 35(a) and 35(b). This spray can 600 comprises a sealed can body 14, a spout path 16, an opening/closing means 18, a breaking means 602 for breaking a part of the spout path 16, a guard 604 which is attached to a caulked projection 15 of the sealed can body 14, and a lever piece 606 which is attachably/detachably attached to the guard 604. The braking means 602 comprises a movable member 32. By deeply pushing down the movable member 32, the movable member 32 breaks and separates the pipe supporting member 28. Around the pipe supporting member 28, a notch 42 of a V-shaped cross section is provided so as to easily separate the pipe

supporting member 28. Further, on top of the movable member 32, a pushing member 38 is provided.

On the top of the guard 604 is provided a pair of grooves 608. Each groove 608 has a pair of protrusions 610 on its both sides. The lever piece 606 is attachably/detachably attached in the grooves 608 by the protrusions 610. Between one side of the guard 604 and the caulked projection 15 of the sealed can body 14 is formed a side groove 614 which serves as an insertion hole 612. By inserting the lever piece 606 into the insertion hole 612, the lever piece 606 is attachably/detachably engaged at one side of the guard 604. An edge of the lever piece 606 is thin and a U-shaped cut 616 which can be inserted into the movable member 32 is made in the edge of the lever piece 606, as shown in FIG. 35(b).

When the spray can 600 is placed on the market, the lever piece 606 is attached in the grooves 608 and covers the pushing member 38, as shown in FIGs. 35(a) and 35(b), so that the pushing member 38 cannot be pushed down and the cosmetic fluid cannot be released. When the cosmetic fluid is released, the lever piece 606 is removed from the grooves 608 and then the pushing member 38 is pushed down. The lever piece 606 removed from the grooves 608 is inserted into the insertion hole 612 and is engaged at the side of the guard 604. When the spray can is disposed of, the guard 604 is pried away from the sealed can body 14 by using the lever piece 606, the U-shaped cut 616

of the lever piece 606 is inserted into the movable member 32, and thus the pushing member 38 is pried away from the movable member 32 by applying the principle of leverage. After that, the sealed can body 14 is turned upside down, the exposed movable member 32 is pressed against the ground or the like by putting one's weight on the sealed can body 14, and thus the pipe supporting member 28 is broken by the notch 42. In this way, the cosmetic fluid is released to the outside through the broken part and a hollow part 30 by the pressure in the sealed can body 14.

The present invention is intended to embrace various modifications, alternations, and changes made on the basis of knowledge of those skilled in the art without departing from the scope of the invention. Further, any of the specific inventive aspects of the present invention may be replaced with other technical equivalents for embodiment of the present invention, as long as the effects and advantages intended by the invention can be insured. For example, the structure for pushing down the movable member in two stages is not limited to the structures shown in FIGs. 3, 10, 23, and 27, but it may be a structure in which a through hole is formed in the pushing member from its top to the movable member and the movable member is pressed by putting the finger in the through hole if the movable member is required to be more deeply pressed down. Further, the sealed can body is not limited to a cosmetic case

or a gas cylinder. Furthermore, the shapes of the pushing member, the guard, and the cap are not limited to the aforementioned embodiments, but the shape of the pushing member, for example, may be shaped like a bear's head or shaped like an animal or a plant. Further, in the aforementioned embodiments, the spray can has a structure in which the packing 36 which is a blockage between the hollow part 30 of the pipe supporting member 38 and the hollow part 34 of the movable member 32 is bent and deformed by pushing down the movable member 32 against the spring force so that the hollow parts 30 and 34 are linked to release the cosmetic fluid. However, the structure of the spray can of the present invention is not limited to this structure, but various kinds of structures can be used in the spray can, as far as a part of or plurality parts of the closed spout path is/are opened by pushing down the movable member which is pushed up by the spring force so that the cosmetic fluid can spout out. Also, the spring for the movable member is not limited to the coil spring, but a blade spring, air spring, or the like can be also used.

#### INDUSTRIAL APPLICABILITY

As described above, in the spray can having the open-state maintaining means and the pressure releasing structure of the spray can according to the present invention, the spray path can be maintained in its open state. Therefore, when the



spray can is disposed of, pressure can be released by maintaining the spout path in its open state.

In the spray can having the breaking means and the pressure releasing structure of the spray can according to the present invention, a path for releasing the fluid in the sealed can body to the outside can be formed separately, so that a fluid friction or the like can be reduced when the fluid is released. Therefore, when the spray can is disposed of, the fluid spouts out to the outside more quickly and easily .

Further, in the spray can and the pressure releasing structure according to the present invention in which the breaking means functions as means for separating the connecting path, the spout path can be always broken at the same position without fail. Therefore, there are not cases where a path for spouting out the fluid to the outside cannot be formed due to insufficient breaking force or where the size of the path is not large enough to reduce fluid friction or the like.

Furthermore, in the spray can having the restricting means for restricting the distance that the pushing member is pushed and the pressure releasing structure of the spray can according to the present invention, the restricting means prevents breaking of the spout path by restricting the movement of the pushing member in normal use while the restricting means cancels such restriction so that the spout path can be broken when the spray can is disposed of.

Further, in the spray can in which the pushing member of the opening/closing means is the pushing member of the breaking means and the pressure releasing structure of the present invention according to the present invention, the pushing member of the opening/closing means also serves as the pushing member for breaking the spout path. For this reason, the spray can is made more compact and the production cost can be reduced.

In the spray can having the release path forming means and the pressure releasing structure of the spray can according to the present invention, the fluid can be quickly and easily released to the outside, for example, through a release path which is directly connected to the outside of the sealed can body.

Further, in the spray can having the locking means and the pressure releasing structure of the spray can according to the present invention, since the cosmetic fluid cannot be released unless the locking means is disengaged, there is no need to provide a cap to the spray can. Therefore, the spray can is made more compact and the production cost can be reduced.